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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,092	03/30/2004	Kazuyoshi Mizutani	Q80752	3094

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EXAMINER

HAMILTON, CYNTHIA

ART UNIT PAPER NUMBER

1752

DATE MAILED: 02/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/812,092	MIZUTANI ET AL.	
	Examiner	Art Unit	
	Cynthia Hamilton	1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03/30/03, 5/26/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-14 is/are rejected.
- 7) ☒ Claim(s) 10 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 03/30/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-2, 4-9, 11 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Urano et al (5,558,976). Example 22 of Urano et al anticipates the instant composition and method set forth in applicant's claims 1-2, 4-9, 11 and 14. Poly (p-1ethoxyethoxystyrene/p-hydroxystyrene/p-tetrahydropyranyloxystyrene which is the polymer of Synthesis Example 9 of Urano et al. wherein Z is ethyl and L₂ is ethyl, or Z and L₂ combine to form an alicyclic ring as part of the tetrahydropyranyl ring and wherein W is ethyl and L₄ is ethyl, or W and L₂ combine to form an alicyclic ring as part of the tetrahydropyranyl ring. In each case L₂ and L₃ are hydrogen. The polymer of Urano et al is a species of the genus of instant claims 1-2, 4-9, 11 and 14. With respect to other species of photoresist and instant claims 1-2, species of polymer cited by Urano et al as of use in their compositions of (a) a terpolymer, (b) a photoacid generator and (c) a solvent as set forth in the instant Abstract are the following polymers which are all species of the instant polymer found in col. 13, lines 46-51:

poly[p-(1-ethoxyethoxy)styrene/p-hydroxystyrene/p-tetrahydrofuranlyloxystyrene], poly[p-(1-ethoxyethoxy)styrene/p-hydroxystyrene/p-tetrahydropyranyloxystyrene, poly[p-(1-methoxyethoxy)styrene/p-hydroxystyrene/p-tetrahydropyranyloxystyrene],
--

The tetrahydrofuranlyloxystyrene ring would have five members instead of the six members of the tetrahydropyranyloxystyrene.

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3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Urano et al (5,558,976) as applied to claim 1 above, and further in view of Aoi et al (5,837,420). With respect to instant claim 3, Urano et al teaches all of the species set forth above except the limitation that the polymer used have a molecular weight dispersion degree of 1.5 or below. Aoi et al teach for similar positive working photosensitive compositions that the dispersion degree be particularly 1.0 to 1.6 with the smaller the dispersion degree of a resin being the better heat resistance and image forming characteristics such as pattern profile, defocus latitude, etc. the resin can provide. In Aoi et al, see particularly the paragraph bridging col. 38-39. The smallest number polydispersity can be is 1.0 for this is the perfect situation wherein $M_w=M_n$ and all the polymer chains are essentially the same length. Thus, with respect to instant claim 3, the formation of the polymers of Urano et al with a polydispersity as close to 1.0 as possible would be prima facie obvious in view of Aoi et al teaching the desire to improve heat resistance and image forming characteristics by doing so.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1 and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Urano et al (5,558,976). With respect to instant claim 1, Urano et al teach the instant resist material in their abstract and Summary of the Invention with the selection of R_5 being a tetrahydropyranyloxy group or a tetrahydrofuranyloxy group as one of several specific groups. With respect to instant claim 1, the use of any one of the R_5 groups listed would have been prima

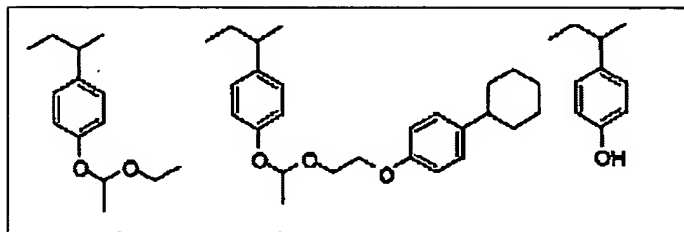
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facie obvious to form a resist material imageable in electron beam, soft Xray or deep ultraviolet light as taught by Urano et al. With respect to instant claims 12 and 13, the optional use of surfactants inclusive of fluorine containing nonionic surfactants is taught by Urano et al in col. 22, lines 57-68 along with the use of sensitivity adjustors which when considered as a group would be recognized as species of basic compounds as found in instant claim 13. With respect to instant claims 12-13, the optional use of the sensitivity adjustors or/and surfactants set forth by Urano et al in their resist compositions would have been prima facie obvious as taught to adjust the sensitivity or act upon the surface forming properties of the photoresist material.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Urano et al (5,558,976) as applied to claim 1 above, and further in view of Aoai et al (5,837,420). With respect to instant claim 3, Urano et al teaches all of the species set forth above except the limitation that the polymer used have a molecular weight dispersion degree of 1.5 or below. Aoai et al teach for similar positive working photosensitive compositions that the dispersion degree be particularly 1.0 to 1.6 with the smaller the dispersion degree of a resin being the better heat resistance and image forming characteristics such as pattern profile, defocus latitude, etc. the resin can provide. In Aoai et al, see particularly the paragraph bridging col. 38-39. The smallest number polydispersity can be is 1.0 for this is the perfect situation wherein $M_w = M_n$ and all the polymer chains are essentially the same length. Thus, with respect to instant claim 3, the formation of the polymers of Urano et al with a polydispersity as close to 1.0 as possible would be prima facie obvious in view of Aoai et al teaching the desire to improve heat resistance and image forming characteristics by doing so.

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7. Claims 1-2, 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Toru et al (JP 2002-49156) as evidenced by Toru et al (Patent Abstracts of Japan). With respect to instant claims 1-2, 12-14, the compositions of claims 1-4 of Toru et al (Patent Abstracts of Japan) clearly set forth a genus overlapping that of applicants' invention wherein W and Z must not be the same. The examiner has submitted the entire document for translation but does not at this time have such a translation. On page 5 of Toru et al (Patent Abstracts of Japan) at [0147] such a polymer is made into a resist with solvent and photoacid generator then at [0156] it is imaged with a KrF excimer laser which has a wavelength of exposure at 248 nm which is within the range of deep ultraviolet light. The examiner believes the B1 polymer has the following structure as shown in Toru et al (JP 2002-49156) at [0058].

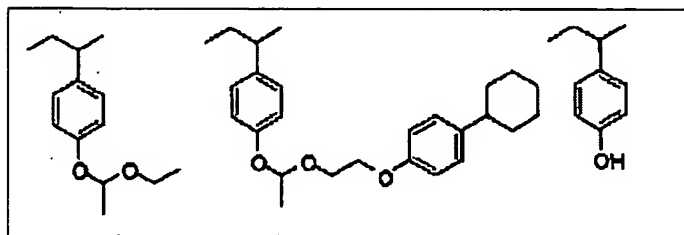


What other polymers are used by Toru et al are unclear as they are identified in the example in a table untranslated.

8. Claims 1-2, 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toru et al (JP 2002-49156) as evidenced by Toru et al (Patent Abstracts of Japan). With respect to instant claims 1-2, 12-14, the compositions of claims 1-4 of Toru et al (Patent Abstracts of Japan) clearly set forth a genus overlapping that of applicants' invention wherein W and Z must not be the same. The examiner has submitted the entire document for translation but does not at this time have such a translation. On page 5 of Toru et al (Patent Abstracts of Japan) at [0147] such a polymer is made into a resist with solvent and photoacid generator then at [0156] it is imaged with a KrF excimer laser which has a wavelength of exposure at 248 nm which is within

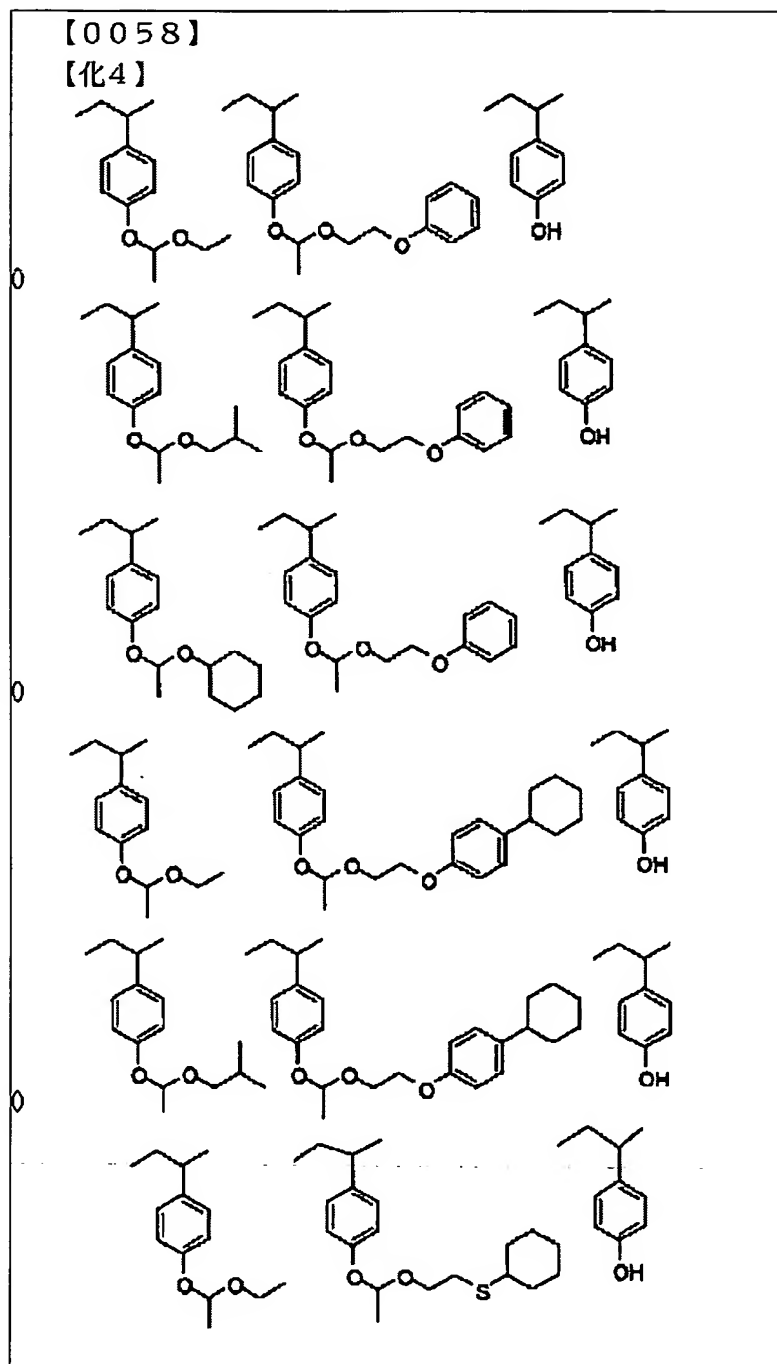
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the range of deep ultraviolet light. The examiner believes the B1 polymer has the following structure as shown in Toru et al (JP 2002-49156) at [0058].



What other polymers Toru et al use are unclear as they are identified in the example in a table un-translated. With respect to the other polymers set forth in [0058], the use of any of the polymers set forth by Toru et al that fit the disclosure of their claimed polymers would have been prima facie obvious to produce a positive photoresist composition having improved marginal resolving power, less development defects, better linearity and dry etching resistance as set forth in the abstract for Toru et al. The polymers set forth in [0058] of Toru et al are as follows:

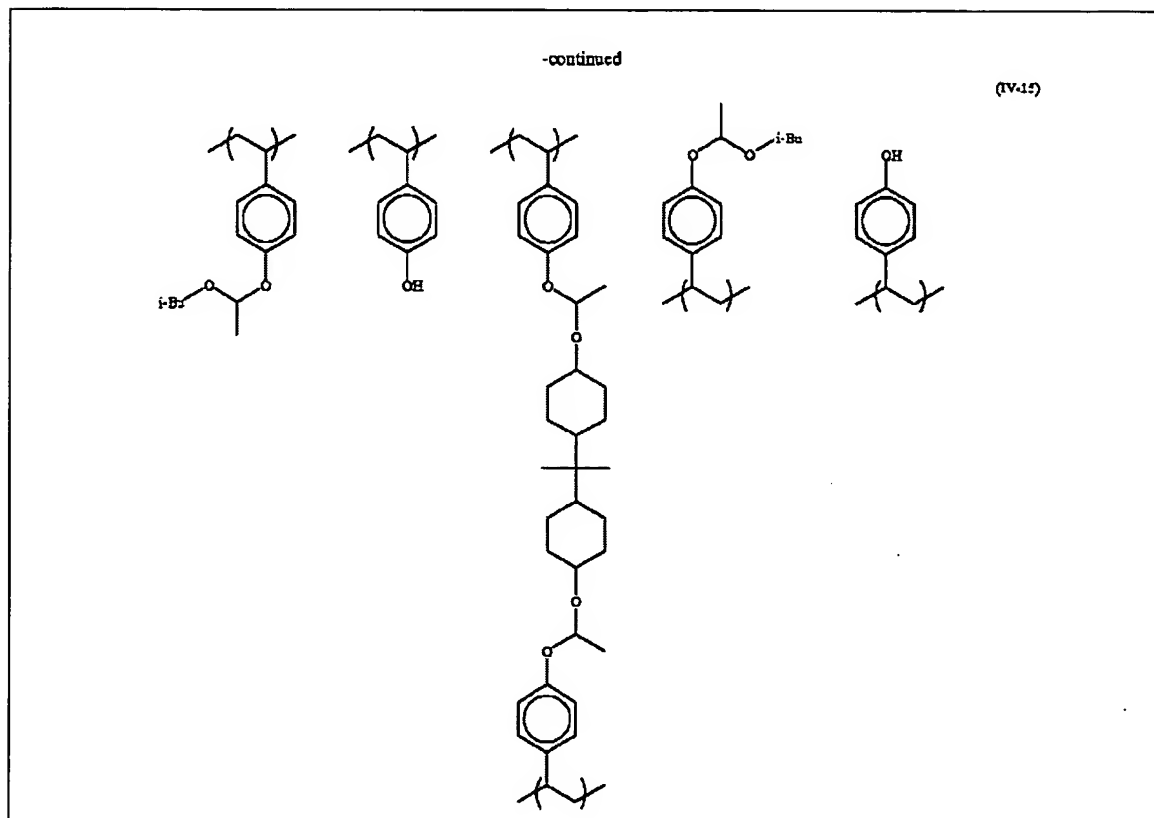
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9. Claims 1-2 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishiyama et al (US 2001/0008739 A1). The photoresist compositions and processes of the Abstract of Nishiyama et al (US 2001/0008739 A1) disclose the instant invention of claims 1-2 and 14 with

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the exception of the specific resin wherein Kr F excimer laser beam is a species of the instant “an actinic ray or radiation”. However, with respect to instant claims 1-2 and 14, Nishiyama et al discloses on page 15 the resin (IV-15) as one which can be used in their photoresists and methods. This resin is as follows:

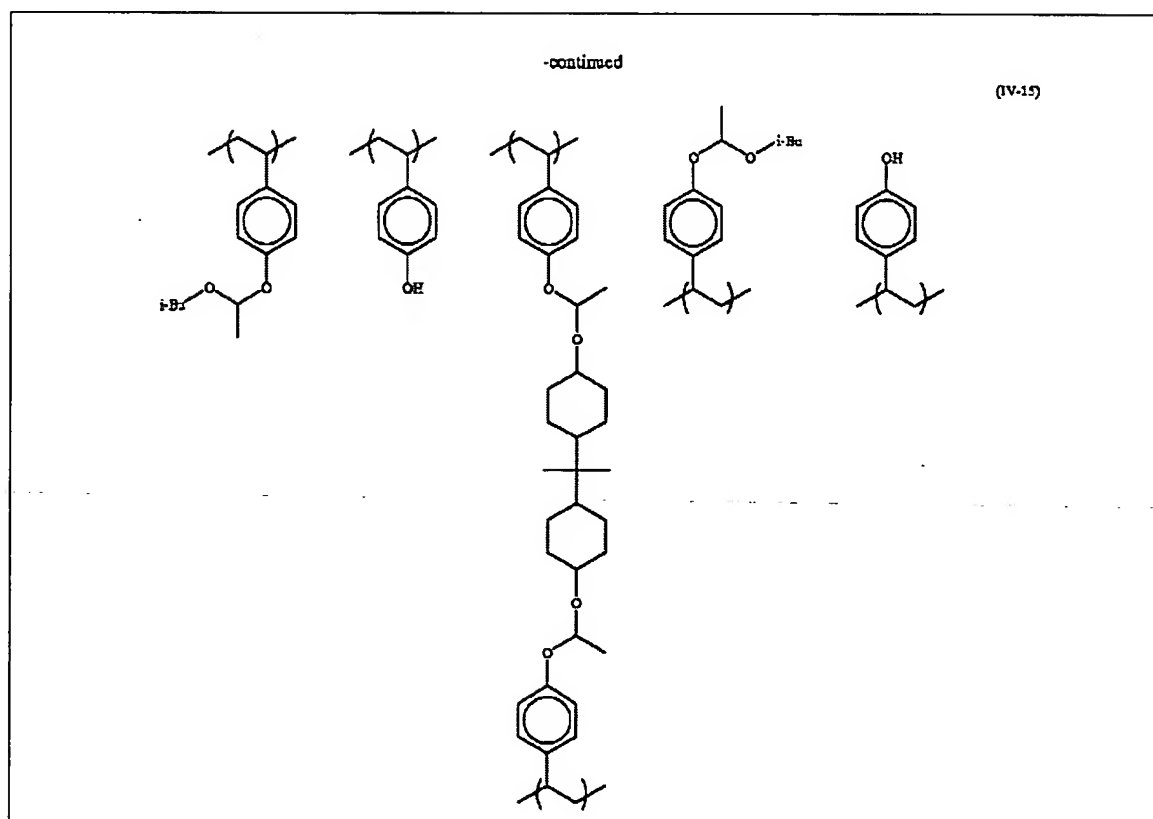


The first mer is the instant (I) , the second mer is the instant (III) and the third mer is the instant (II) wherein the W is substituted with the crosslinking group set forth. With respect to the scope of W, applicants in their own specification on page 11, second paragraph, last two lines disclose that W may have a substituent. There is no limit on this substituent. The examiner holds that the substituent is the crosslinked chain of the polymer as set forth in Nishiyama et al. Thus, with respect to instant claims 1-2 and 14, the choice of any one of the polymers specifically given by Nishiyama et al to be of use in the compositions and methods set forth would have been

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immediately envisionable by a worker of ordinary skill in the art thus, causing such a composition and method of using to anticipate the instant compositions and methods.

10. Claims 1-2 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiyama et al (US 2001/0008739 A1). The photoresist compositions and processes of the Abstract of Nishiyama et al (US 2001/0008739 A1) teach the instant invention of claims 1-2 and 14 with the exception of the specific resin wherein Kr F excimer laser beam is a species of the instant "an actinic ray or radiation". However, with respect to instant claims 1-2 and 14, Nishiyama et al discloses on page 15 the resin (IV-15) as one which can be used in their photoresists and methods. This resin is as follows:



The first mer is the instant (I) , the second mer is the instant (III) and the third mer is the instant (II) wherein the W is substituted with the crosslinking group set forth. With respect to the scope

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of W, applicants in their own specification on page 11, second paragraph, last two lines disclose that W may have a substituent. There is no limit on this substituent. The examiner holds that the substituent is the crosslinked chain of the polymer as set forth in Nishiyama et al. Thus, with respect to instant claims 1-2 and 14, the choice of any one of the polymers specifically given by Nishiyama et al to be of use in the compositions and methods set forth would have been prima facie obvious causing such a composition and method of using to be prima facie obvious.

11. Claims 1-9 and 11-14 are rejected under 35 U.S.C. 102(a or e) as being anticipated by Blakeney et al (US 2003/0065101 A1) as optionally evidenced by Tsuei (US 5,643,669) or Tsiartas et al (Macromolecules). With respect to instant claims 1-9 and 11-14, the Lithographic Examples of Blakeney et al anticipate the instant positive resist and method of imaging wherein Silwet L-7210 in lithographic example 2 is as evidenced by Tsuei in col. 13, lines 22-25, is a silicon surfactant, i.e. as required in instant claim 12, wherein Lithograph Example 3 adds tetramethyl ammonium hydroxide as a basic compound, i.e. as required in instant claim 13. The use of any of the polymers set forth in [0058-0073] inclusive of the those such as SE-4 with a PD 1.2 or SE-5 with PD 1.2 wherein PD is as evidenced by Tsiartas et al at Table 2 on page 466 wherein PD is used to reference polydispersity which is the same as “molecular weight dispersion degree” as found in instant claim 3. Thus, with respect to instant claims 1-9 and 11-14, the resists of Blakeney et al anticipate the instant resists and processes.

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Kim (6,051,370) is an English equivalent of applicant's cited JP 04-219757.

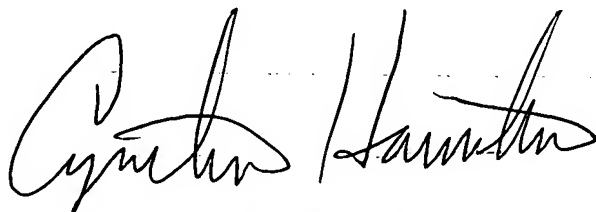
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13. Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Hamilton whose telephone number is 571-272-1331. The examiner can normally be reached on Monday through Friday 9:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H Kelly can be reached on (571) 272-0729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Cynthia Hamilton
Primary Examiner
Art Unit 1752

February 15, 2005

CYNTHIA HAMILTON
PRIMARY EXAMINER